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ABSTRACT

To assess the effect of contextual stimuli on learning, a study was conducted to see if providing instruction to students in one setting and testing them in yet another setting had an effect on their recall. Twenty-eight college students were randomly divided into two groups, and both were exposed to a multimedia instructional presentation. Then, one group was tested in the laboratory where they were instructed, and the other group was transfered to another location and then tested. An analysis of the test results showed that the displaced group scored significantly lower. (EMH)

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The Influence of Contextual Stimuli On Test Performance of College Students

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Abstract

This study was conducted to determine if a change in location from presentation of material to application of the material in a testing situation effects a students score on a teacher made achievement test. The material was presented via audio tape-filmstrip units in an independent study laboratory. The students were then divided into two groups to determine the influence of contextual stimuli in a testing situation. The control group took the examination in the laboratory where the material was presented, and the experimental group took the examination if a different room. An analysis of variance indicated that the control group achieved a significantly higher score on the examination than the experimental group.

With increased interest in individual differences among learners, alternate instructional methods are becoming more sophisticated. Of the methods which have evolved, the automated instructional laboratory is one that has developed steadily since World Was II. Educators often fail, however, to devise alternate evaluation methods to match these new teaching techniques. Consequently, while students are allowed to learn independently and at their own rate, and in their preferred modality or environment,

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we still may test them in large groups or traditional settings. It is important to determine whether differences between the learning environment (automated independent study laboratories) and the evaluation environment (regular classrooms) have an impact on student performance on teacher made achievement tests.

A learning or testing environment is a complex of stimuli, e.g., room, mode of stimulus presentation, stray noises, internal variables, etc. The stimuli present during the learning or testing environment are referred to as "contextual stimuli".

In view of the trend toward automated independent study, it is important to determine under what conditions transfer is facilitated. The purpose of this study is to reassess the effect of contextual stimuli on learning. More specifically, it is concerned with whether a change from an independent study laboratory to an unfamiliar environment has a detrimental effect on student performance on a teacher made achievement test.

The principle of stimulus generalization predicts that a learned association is less likely to occur when the initial stimulus is altered than when the initial stimulus is unchanged. As the altered stimulus becomes more dissimilar, either through actual chance in the stimulus itself or the stimulus setting, it is even less likely to produce the original association (Hilgard and Bower, 1966).

In classroom testing, Abernathy (1940) found that if contextual stimuli are altered, i.e., a change in room and a change in instructor, recall is poorer. This study corroborated Dulsky's (1935) findings that a change in background has a detrimental effect upon recall.

He drew the following conclusion: "When the materials become associated with the environment during learning, any change of that environment is likely to prove detrimental to recall" (Dulsky, 1935, p. 739). His interpretation of contextual stimuli is "new environmental conditions".

In experimental psychology, Bower (1972) discusses contextual stimuli in terms of background and interoceptive stimulation during presentation of the experimental stimuli. Bower refers to the free flow of the "stream of consciousness". He interprets this as the internal monologue as the subject describes to himself what is going on around him and comments on this description. He explains the poorer learning that resulted from changed context in his experiment as an alteration of the encoding process. If background context is altered, different encoding operations are at work within our stream of consciousness.

In studies on perception, Bevan (1968) discusses various studies designed to investigate the influences on behavior that can be attributed to properties in the stimulus setting. He points out that perceptual constancy cannon be fully understood without considering context. Epstein and Park (1963) report studies using no background (a stimulus presented in a darkened room), different colored background, and stimuli presented tilted around the horizontal axis and rotated around the vertical axis. These researchers found that these presentations influenced the judgement of subjects.

Although these areas of research dealt with context for different reasons, they all reported the same results. Whether it be

a result of associations developed, encoding, or perception, a change in background does have a deleterous effect upon learning.

The above studies provide the theoretical basis for this study. In addition, they led this researcher to the following hypothesis.

H_1 Scores are higher on a teacher made achievement test when students are tested in the same location in which the material was presented then when they are tested in a different location.

METHOD

Undergraduate students (N=28) were randomly assigned to two groups, control and experimental. Treatment was then randomly assigned to the two groups. All material was presented via audio tape-filmstrip segments ranging in length from seven to 33 minutes. Students viewed a total of nine segments. Figure 1 lists these units and the playing time for each. The independent study carrels used by the students measure two feet four inches by two feet nine inches and contain open reel tape players and filmstrip viewers.

Figure 1. Units in Automated Independent Study

Unit Title	Playing Time
Production of Still Projected Media, Part 1	25 minutes
Production of Still Projected Media, Part 2	20 minutes
Pictorial and Other Graphic Materials	23 minutes
Chalkboards, Clingboards, and Bulletin Boards	33 minutes
Maps, Globes, and 3-D Materials	22 minutes
Auditory Materials	7 minutes
Television in Education	24 minutes
Teaching Machines and Programmed Instruction	26 minutes
Educational Media Center and Community Resources	15 minutes

Depicted in linear form, the treatment was presented as follows.

1. Twenty-eight students were presented material via audio tape-filmstrip lesson segments in an independent study laboratory.

2. The control group took the examination in the independent study laboratory.

3. The experimental group took the examination in a conference room unfamiliar to the students.

4. The same instructor was present in both testing situations.

5. In order to make this as much like a classroom testing situation as possible, no effort was made to limit time spent by the students studying outside the independent study laboratory.

The examination instrument employed was a teacher made achievement test. Each of the 46 items had four alternatives. Content validity was established by the five instructors who teach the course which is responsible for covering the material. The Kuder Richardson 20 reliability coefficient for the examination was .83.

RESULTS

The dependent variable for this study was the raw score obtained on the examination. A one way analysis of variance (ANOVA) was performed on this data. Table 1 gives the means and standard deviations of the two groups.

Table 1. Means and Standard Deviations of Groups

Control Group	Experimental Group
$\bar{x}$ = 38.86	$\bar{x}$ = 36.21
S.D. = 3.18	S.D. = 3.51

Table 2 is a summary of the ANOVA.

Table 2. Summary of Analysis of Variance

	df	Mean Square	F Ratio	P
Between Groups	1	48.89	4.35	.05
Within Groups	26	11.23		

As indicated, these results show significance for the treatment ($F=4.35$, df 1/26, $p<.05$). These results indicate that a change in context (testing environment) does decrease student performance on a teacher made achievement test.

CONCLUSIONS

The experimenter believes locational contextual stimuli have an important impact on scores made by college students on teacher made achievement tests. The results of the earlier studies and analasis of the present data provide the basis for this belief. At the college level material is often presented in one setting while testing is administered in another setting. It is this researchers belief that concern for the affect of contextual stimuli will become more prominent with the increased usage of individualized automated instruction. As classroom teachers, perhaps we should concern ourselves with the impact of these background changes. If through our individualized instructional methods we produce situations simil. to the environment in which the learner must inevitably function, it appears that we may expect meaningful transfer. If, however, we

are producing artificial environments with little resemblance to the world in which the learner will be required to function, these individualized and self-paced methodologies may be working against our instructional purposes.

Certain training programs already attempt to make the training situation simulate the environment in which material learned must be applied. The military has used simulators to train pilots for several years. In as many respects as possible, these simulators are exact duplicates of actual airplanes and are capable of producing similar sensory stimuli. Drivers training courses often use generalized simulators for students. These produce an environment close to that in which the student will have to function. Also, scale models of tankers and barges are used for training officers for duty in the Navy and Coast Guard.

What can we as educators do to simulate the environment in which a prospective teacher will have to function? Aside from the logical answer of increasing the amount of time prospective teachers spend in the field, the advanced technology available at present may possibly hold a portion of the answer. As more programs are developed that incorporate individualized and self-paced instruction, we must strive for programs with environmental conditions as close as possible to actual classrooms.

The experimenter realizes that more experimentation is needed in this area. As a result of this study, the experimenter plans to look at mode of presentation and mode of testing, and their interrelationship to effects on achievement test scores. Other research planned includes an attempt to determine if a relationship exists between contextual stimuli and a students perceptual type.

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